ITS UNIT COST DATABASE (as of September 30, 2001)

Subsystem/Unit Cost Element	IDAS No.^	Lifetime* (years)	Capital Cost ($K)		O&M Cost ($K/yr)		Notes
			Low	High	Low	High	
Roadside Telecommunications (RS-TC)							
DS0 Communication Line	TC001	20	0.5	1	0.6	1.2	56Kbps capacity. Leased with typical distance from terminus to terminus is 8-15 miles, but most of the cost is not distance sensitive.
DS1 Communication Line	TC002	20	0.5	1	4.8	8.4	1.544Mbps capacity (T1 line). Leased with typical distance from terminus to terminus is 8-15 miles, but most of the cost is not distance sensitive.
DS3 Communication Line	TC003	20	3	5	24	72	44.736 Mbps capacity (T3 line). Leased with typical distance from terminus to terminus is 8-15 miles, but most of the cost is not distance sensitive.
ISP Service Fee	TC007				0.12	0.18	Monthly service fee ($10 to $15 per month).
Direct Bury Armor Encased Fiber Cable				60		0.02	Cost is per mile.
Conduit Design and Installation - Corridor				65		0.02	Cost is per mile.
Twisted Pair Installation				12		0.02	Cost is per mile.
Fiber Optic Cable Installation				20		0.02	Cost is per mile.
Telephone Drop			1	3	0.2	0.3	Cost is per drop.
Cellular Communication				0.5	0.3	0.4	Cost is for one unit.
900 MHz Spread Spectrum Radio				9	0.15	0.4	Cost is per link.
Microwave Communication				15	0.3	0.7	Cost is per link.
Wireless Communications, Low Usage	TC004				0.18	0.2	125 Kbytes/month available usage.
Wireless Communications, Medium Usage	TC005				0.6	0.7	1,000 Kbytes/month available usage.
Wireless Communications, High Usage	TC006	20	0.5	1	1.2	1.8	3,000 Kbytes/month available usage.
Call Box		10		5.9		0.714	Capital cost includes call box and installation. O&M is cost per unit (per year) for service maintenance contract and annual cellular service fee.
Roadside Detection (RS-D)							
Inductive Loop Surveillance on Corridor		5	3	8	0.5	0.8	Double set (4 loops) with controller, power, etc.
Inductive Loop Surveillance at Intersection		5	9	16	1	1.6	Four legs, 2 lanes/approach.
Machine Vision Sensor on Corridor			21.7	29	0.2	0.4	One sensor both directions of travel.
Machine Vision Sensor at Intersection			20	25.7		0.2	Four-way intersection, one camera per approach.
Passive Acoustic Sensor on Corridor			3.7	8	0.2	0.4	Cost range is for a single sensor covering up to 5 lanes. Low cost is for basic sensor, which consists of the sensor, mounting kit, junction box, & cabinet termination card. High cost includes basic sensor with solar and wireless option. This option consists of an antenna, solar charger, battery, & panel, and wireless base station, which will handle up to 8 sensors. Capital costs do not include installation or mounting structure.
Passive Acoustic Sensor at Intersection				15	0.2	0.4	Four sensors, 4 leg intersection.
Remote Traffic Microwave Sensor on Corridor				6	0.2	0.4	One sensor both directions of travel.
Remote Traffic Microwave Sensor at Intersection				18	0.2	0.4	Four sensors, 4 leg intersection.
CCTV Video Camera	RS007	10	7.5	17	1.5	2.4	Cost includes color video camera with pan, tilt, and zoom (PTZ), and installation.
CCTV Video Camera Tower	RS008	20		12			Cost is for a 90 ft. aluminum pole; includes foundation, pole, conduit, and labor. Cost will be lower for a lower height pole.
Automated Flood Warning System				42			Includes sensors (rain, water level, weather, etc.) in the field which report via radio to a central receiver/decoder, which then sends data to a base station computer for storage and analysis.
Pedestrian Detection							
Microwave				0.6			Cost is per device. Typical deployment consists of 2 devices per crosswalk for detection of pedestrian in crosswalk. Can be used for detection of pedestrian at the curbside.
Infrared				0.3			Cost is per device. Typical deployment consists of 2 devices per crosswalk for detection of pedestrian at the sidewalk.
Environmental Sensing Station (Weather Station)		25	10	50	1.9	4.1	Environmental Sensing Station (ESS), also known as a weather station, consists of pavement temperature sensor, subsurface temperature sensor, precipitation sensor (type & rate), wind sensor (speed & direction), air temperature and humidity sensors, visibility sensors, and remote processing unit (RPU). ESS provide condition data and are basic components of larger Road Weather Information Systems (see RWIS under TMC subsystem). RPU replaced every 5 years at $6.4K. O&M includes calibration, equipment repairs, and replacement of damaged equipment. O&M costs could be higher if state provided maintenance.
Traffic Camera for Red Light Running Enforcement			75	100	60		Low capital range is for a 35-mm wet film camera, which includes installation of the camera ($25K) and associated equipment (e.g., pole, loop detectors, cabinet foundation). High capital range is for digital camera, which includes a total of 4 cameras, 3 monochrome & 1 color, for a 3-lane approach. O&M cost is for one 35-mm wet film camera per year. Note, most jurisdictions contract with a vendor to install and maintain, and process the back office functions of the RLR system. The vendor receives compensation from fines charged to violators.
Lowering System		20	5	8			The lowering system includes the pole. Cost is for a typical 50 ft. steel pole and lowering system. The lowering system is available for use with all types of poles (e.g., steel, concrete, aluminum, fiberglass) and virtually any mounting height and with any ITS pole mounted device (e.g., CCTV cameras, radar traffic detectors). Installation costs not included. The lowering system is mechanically operated; requires routine lubrication.
Roadside Control (RS-C)							
Linked Signal System LAN	RS002	20	40	70	0.4	0.8	Linked signal system LAN.
Signal Controller Upgrade for Signal Control	RS003	20	2.5	10	0.2	0.5	Per intersection.
Signal Controller			11	17.5	0.2	0.9	Includes installation of traffic signal controller per intersection.
Traffic Signal			95	115	2.4	3	Includes installation for one signal (four leg intersection). Costs range from traffic signal with inductive loop detection to non-intrusive detection.
Signal Preemption Receiver	RS004	5	2	8	0.05	0.2	Two per intersection.
Signal Controller Upgrade for Signal Preemption	RS005	10	2	5			Add-on to base capability (per intersection).
Roadside Signal Preemption/Priority			2.5	5.5			Includes infrared detector, detector cable, phase selector, and system software. Capital costs range is for 2-directions (low) and 4-directions (high). Does not include installation costs.
Ramp Meter	RS006	5	30	50	1.5	3.5	Per location. Includes controller, power, etc.
Software for Lane Control	RS011	20	25	50	2.5	5	Software and hardware at site. Software is off-the-shelf technology and unit price does not reflect product development.
Lane Control Gates	RS012	20	100	150	2	3	Per location.
Fixed Lane Signal	RS009	20	6	8	0.6	0.8	Cost per signal.
Automatic Anti-icing System							
Short span		12	25		2		Typical automatic anti-icing system consists of a control system, chemical storage tank, distribution lines, pump, and nozzles. Pump and control hardware replaced every 5 years at cost of $3.5K. For a short span system ranging from 120 to 180 feet. O&M includes system maintenance, utilities, materials, and labor.
Long Span		12	50	495	1.5	29.5	Typical automatic anti-icing system consists of a control system, chemical storage tank, distribution lines, pump, and nozzles. Pump and control hardware replaced every 5 years at cost of $3.5K. For a long span system ranging from 320 feet to greater than 1/2 mile. O&M includes system maintenance, utilities, materials, and labor. The high O&M cost is for a much larger system; hence, the need for a greater amount of materials.
Roadside Information (RS-I)							
Roadside Message Sign	RS010	20	50	75	2.5	3.75	Fixed message board for HOV and HOT lanes.
Wireline to Roadside Message Sign	RS013	20	6	9			Wireline to VMS (0.5 mile upstation).

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Subsystem/Unit Cost Element	IDAS No.^	Lifetime* (years)	Capital Cost ($K)		O&M Cost ($K/yr)		Notes
			Low	High	Low	High	
Variable Message Sign	RS015	20	48	120	2.4	6	Low capital cost is for smaller VMS installed along arterial. High capital cost is for full matrix, LED, 3-line, walk-in VMS installed on freeway.
Variable Message Sign Tower	RS016	20	25	125			Low capital cost is for a cantilever structure. High capital cost is for a truss structure that will span across 3-4 lanes. VMS tower structure requires minimal maintenance.
Variable Message Sign - Portable		14	21.5	25.5	1.2	2	Trailer mounted VMS (3-line, 8" character display); includes trailer, solar or diesel powered
Highway Advisory Radio	RS017	20	16	32	0.6	1	Capital cost is for a 10-watt HAR. Includes processor, antenna, transmitters, battery back-up, cabinet, rack mounting, lighting, mounts, connectors, cable, and license fee. Super HAR costs an additional $9-10K (larger antenna). Primary use of the super HAR is to gain a stronger signal.
Highway Advisory Radio Sign		10	5		0.25		Cost is for a HAR sign with flashing beacons and variable message capability. Includes cost of the controller.
Roadside Probe Beacon	RS020	5	5	8	0.5	0.8	Radio beacons (per location).
LED Count-down Signal		10	0.325	0.45			Costs range from low (2 12X12 inch dual housing unit) to high (1 16X18 single housed unit). Signal indicates time remaining for pedestrian to cross, and a walk or don't walk icon. Count-down signals use low 8-watt LED bulbs, which require replacement approximately every 5-7 years.
Variable Speed Display Sign			3.7	5			Low range is for a variable speed limit display system. High range includes static speed sign, speed detector (radar), and display system.
Roadside Rail Crossing (R-RC)							
Rail Crossing 4-Quad Gate, Signals	RS021	20	115	130	4.25	4.85	Gates and signals.
Rail Crossing Train Detector	RS022	20	16	21.5	0.77	1.03	Train detector circuitry and communication line from intelligent interface controller (IIC) to wayside interface equipment (WIE). Assume two track crossing with two 0.5 mile communication lines.
Rail Crossing Controller	RS023	10	8	10	0.4	0.5	Intelligent interface controller (IIC).
Rail Crossing Pedestrian Warning Signal, Gates	RS024	20	10	15	0.2	0.3	Pedestrian warning signal and gates.
Rail Crossing Trapped Vehicle Detector	RS025	10	25	30	1.25	1.5	Entrapped vehicle detection camera, with poles and controller.
Toll Plaza (TP)							
Electronic Toll Reader	TP001	10	2	5	0.2	0.5	Readers (per lane).
High-Speed Camera	TP002	10	5	10	0.5	1	Cost includes 1 camera/2 lanes.
Electronic Toll Collection Software	TP003	10	5	10			Includes COTS software and database.
Electronic Toll Collection Structure	TP004	20	10	15			Mainline structure.
Parking Management (PM)							
Entrance/Exit Ramp Meters		10	2	5	0.2	0.5	Ramp meters are used to detect and count vehicles entering/existing the parking facility. O&M costs based on annual service contract.
Tag Readers		10	2	5	0.2	0.5	Readers support electronic payment scheme. O&M costs based on annual service contract.
Database and Software for Billing & Pricing		10	10	15	1	2	Database system contains parking pricing structure and availability. O&M costs based on annual service contract.
Parking Monitoring System		10	14	46			Includes installation, detectors, and controllers.
Hardware		5	2	11.5	0.2	1.15	Hardware is the central computer system. O&M costs based on annual service contract.
Remote Location (RM)							
CCTV Camera	RM001	10	4	5	0.08	0.1	Interior fixed mount camera for security.
Integration of Camera with Existing Systems	RM002	10	2	2.5			Per location.
Informational Kiosk	RM003	7	9.55	50	0.955	5	Includes hardware, enclosure, installation, modem server, and map software for indoor and outdoor.
Integration of Kiosk with Existing Systems	RM004	7	2.2	27.4			Software costs are for COTS (low) and developed/outdoor (high).
Kiosk Upgrade for Interactive Usage	RM005	5	5	8	0.5	0.8	Interactive information display interface (upgrade from existing interface).
Kiosk Software Upgrade for Interactive Usage	RM006	5	10	12			Software is COTS.
Transit Status Information Sign		10		5.5			A LED display installed at transit terminal that provides status information on transit arrival.
Smart Card Vending Machine	RM007	5	37	40	1.85	2	Ticket vending machine for smart card.
Software, Integration for Smart Card Vending	RM008	20	3	5			Software is COTS.
Emergency Response Center (ER)							
Basic Facilities, Comm for Large Area	EM006		4000	4000	400	600	For population >750,000.
Basic Facilities, Comm for Medium Area	EM007		3200	3200	400	480	For population <750,000 and >250,000.
Basic Facilities, Comm for Small Area	EM008		2800	2800	400	420	For population <250,000.
Emergency Response Hardware	EM001	10	15	30	0.3	0.6	Includes 3 workstations.
Emergency Response Software	EM002	10	70	150	0.5	3.5	Includes emergency response plans database, vehicle tracking software, and real traffic coordination.
Emergency Response Labor	EM003				50	165	Two people. Salary costs are fully loaded including salary, overtime, overhead, benefits, etc.
Emergency Management Communications Software	EM004	20	5	10	2.5	5	Shared database between 4 sites. Cost is per site; software is COTS.
Hardware, Software Upgrade for E-911 and Mayday	EM005	10	105	180	1.7	2.5	Data communications translation software, E911 interface software, processor, and 3 workstations.
800 MHz. 2-way Radio		5	0.8	1.7	0.09	0.12	Cost is per radio.
Emergency Vehicle On-Board (EV)							
Communications Interface	EV001	10	0.3	2		0.02	Emergency vehicle communications. Cost is per vehicle.
Signal Preemption/Priority Emitter			0.5	1.2			Data-encoded emitter; manually initiated.
Information Service Provider (ISP)							
Basic Facilities, Comm for Large Area	IS019		4000	4000	400	600	For population >750,000. (stand-alone)
Basic Facilities, Comm for Medium Area	IS020		3200	3200	400	480	For population <750,000 and >250,000. (stand-alone)
Basic Facilities, Comm for Small Area	IS021		2800	2800	400	420	For population <250,000. (stand-alone)
Information Service Provider Hardware	IS001	5	40.5	49.5	0.81	0.99	Includes 2 servers and 5 workstations.
Systems Integration	IS017	20	90	110			Integration with other systems.
Information Service Provider Software	IS002	20	275	550	13.75	27.5	Includes database software (COTS) and traffic analysis software.
Map Database Software	IS003	2	15	30			Software is COTS.
Information Service Provider Labor	IS004				175	250	2 Staff @ 50K to 75K and 1 staff @ 75K to 100K. Salary cost are fully loaded prices and include base salary, overtime, overhead, benefits, etc.
FM Subcarrier Lease	IS005				120	240	Cost is per year.
Hardware Upgrade for Interactive Information	IS006	5	18.9	23.1	0.378	0.462	Includes 1 server and 2 workstations.
Software Upgrade for Interactive Information	IS007	20	250	500	12.5	25	Trip planning software (includes some development costs).
Added Labor for Interactive Information	IS008				100	150	1 Staff @ 50K to 75K. Salary cost are fully loaded prices including base salary, overtime, overhead, benefits, etc.
Software Upgrade for Route Guidance	IS009	20	250	500	12.5	25	Route selection software. Software is COTS.
Map Database Upgrade for Route Guidance	IS010	2	100	200			Map database software upgrade.

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Subsystem/Unit Cost Element	IDAS No.^	Lifetime* (years)	Capital Cost ($K) Low	Capital Cost ($K) High	O&M Cost ($K/yr) Low	O&M Cost ($K/yr) High	Notes
Hardware Upgrade for Emergency Route Planning	IS011	5	13.5	16.5	0.27	0.33	Includes 1 server.
Software Upgrade for Emergency Route Planning	IS012	20	50	100	2.5	5	Route guidance software. Software is COTS.
Hardware Upgrade for Dynamic Ridesharing	IS013	5	5.4	6.6	0.108	0.132	Includes 2 workstations.
Software Upgrade for Dynamic Ridesharing	IS014	20	100	200	5	10	Software includes some development cost.
Added Labor for Dynamic Ridesharing	IS015				100	150	1 Staff @ 50K to 75K for 2 shifts. Salary cost are fully loaded prices including base salary, overtime, overhead, benefits, etc.
Liability Insurance for Dynamic Ridesharing	IS016				50	100	50K to 100K per year.
Software Upgrade for Probe Information Collection	IS018	20	250	500	12.5	25	Software includes COTS and some development cost.
Cable TV Traffic Channel Hardware		5		19			Includes hyperconverter, Pentium PC, TV, converter card, video mux, and demux.
Cable Channel Airtime						78	Cost is per year.
Transportation Management Center (TM)							
Basic Facilities, Comm for Large Area	TM040		4000	4000	400	600	For population >750,000.
Basic Facilities, Comm for Medium Area	TM041		3200	3200	400	480	For population <750,000 and >250,000.
Basic Facilities, Comm for Small Area	TM042		2800	2800	400	420	For population <250,000.
Hardware for Signal Control	TM001	5	15	30			Includes 3 workstations.
Software, Integration for Signal Control	TM006	5	180	220			Software and integration, installation and 1 year maintenance. Software is COTS.
Labor for Signal Control	TM002				486	594	Costs include labor for operations (2 @ 50% of the time, at 100K), transportation engineer (1 at 50% of the time, at 100K), update timing plans (2K per system per month for every 10 systems), and signal maintenance technician (2 @ 75K). Salary cost are fully loaded prices including base salary, overtime, overhead, benefits, etc.
Hardware, Software for Traffic Surveillance	TM003	20	135	165	6.75	8.25	Processor and software.
Integration for Traffic Surveillance	TM032	20	225	275	11.25	13.75	Integration with other systems.
Hardware for Freeway Control	TM004	5	15	30			Includes 3 workstations.
Software, Integration for Freeway Control	TM007	5	180	220			Software and integration, installation and 1 year maintenance. Software is off-the-shelf technology and unit price does not reflect product development.
Labor for Freeway Control	TM005				225	275	Labor for operations (2 @ 50% of 100K) and maintenance technicians (2 @ 75K). Salary cost are fully loaded prices including base salary, overtime, overhead, benefits, etc.
Hardware for Lane Control	TM008	5	5.4	6.6	0.27	0.33	Includes 1 workstation and 19" monitor.
Software, Integration for Lane Control	TM009	10	225	275	11.25	13.75	Software development and integration and software upgrade for controllers. Software development is fine tune adjustments for local installations. Otherwise, software is COTS.
Labor for Lane Control	TM010				90	110	Labor for 2 operators @ 50% of 100K.
Software, Integration for Regional Control	TM011	10	300	440			Software and integration, installation and 1 year maintenance. Integration with other TMC's. Software is COTS.
Real-time, Traffic Adaptive Signal Control System		10	120	150	20		The costs range is based on commercially available packages, which run on a centralized computer. The high capital cost includes software packages for graphical user interface and incident management.
Labor for Regional Control	TM012				180	220	Labor for operators (2 @ 50% of 100K), transportation engineer (1 @ 50% of 100K), and maintenance contract. Salary costs are fully loaded prices including base salary, overtime, overhead, benefits, etc.
Video Monitors, Wall for Incident Detection	TM013	5	40.5	49.5	2.025	2.475	Includes 5 19" video monitors and video wall monitors (3x3=9 monitors w/switch).
Hardware for Incident Detection	TM014	5	81.7	119.3	4.085	5.965	Includes 4 servers, 5 workstations, and 2 laser printers.
Integration for Incident Detection	TM025	20	90	110	4.5	5.5	Integration with other systems.
Software for Incident Detection	TM015	5	90	110	4.5	5.5	Software is COTS and includes development cost
Labor for Incident Detection	TM016				630	770	Labor for operators (4 @ 100K and 1 manager @ 150K) and 2 maintenance techs @ 75K.
Video Monitor for Incident Response	TM017	5	2.7	3.3	0.135	0.165	Includes 1 19" monitor.
Hardware for Incident Response	TM018	5	2.7	3.3	0.135	0.165	Includes 1 workstation.
Integration for Incident Response	TM026	20	180	220			Integration with other systems.
Software for Incident Response	TM019	2	13.5	16.5	0.675	0.825	Software is COTS.
Labor for Incident Response	TM020				90	110	Labor for incident management coordinator (1 @ 100K).
Automated Incident Investigation System		5		15			Includes workstation, tripod, monopole antenna, Auto Integration, and AutoCAD software.
Hardware for Traffic Information Dissemination	TM021	5	5	10	0.25	0.5	Includes 1 workstation.
Software for Traffic Information Dissemination	TM022	5	18	22	0.9	1.1	Software is COTS.
Integration for Traffic Information Dissemination	TM023	20	90	110	4.5	5.5	Integration with other systems.
Labor for Traffic Information Dissemination	TM024				90	110	Labor for 1 operator @ 100K. Salary costs are fully loaded and include base salary, overtime, overhead, benefits, etc.
Software for Dynamic Electronic Tolls	TM027	5	22.5	27.5	1.125	1.375	Includes software installation and 1 year maintenance. Software is COTS.
Integration for Dynamic Electronic Tolls	TM028	20	90	110	4.5	5.5	Integration with other systems.
Hardware for Probe Information Collection	TM033	3	5	10	0.5	1	Includes 1 workstation.
Software for Probe Information Collection	TM034	5	18	22	1.8	2.2	Includes software installation and 1 year maintenance. Software is COTS.
Integration for Probe Information Collection	TM035	20	135	165	13.5	16.5	Integration with other systems.
Labor for Probe Information Collection	TM036				45	55	Labor for 1 operator (4 hours per day @ 100K/year). Salary costs are fully loaded prices and include base salary, overtime, overhead, benefits, etc.
Software for Rail Crossing Monitor	TM037	5	18	22	1.8	2.2	Includes software installation and 1 year maintenance. Software is COTS.
Integration for Rail Crossing Monitor	TM038	20	90	110			Integration with other systems.
Labor for Rail Crossing Monitor	TM039				45	55	Operators (1 @ 50% of 100K). Salary costs are fully loaded prices including base salary, overtime, overhead, benefits, etc.
Road Weather Information System (RWIS)		25		25	0.4	2.5	A RWIS consists of several components: an environmental sensing station (ESS), CPU, workstation with RWIS software, and communications equipment. All components of the RWIS reside at the TMC with the exception of the ESS. See Roadside Detection subsystem for costs of ESS. Cost of the ESS ($10K-$50K) should be added to $25K listed here in order to cost out the entire system. CPU replaced every 5 years at a cost of $4K. O&M costs range includes communication, and optional weather forecast/meteorological service.
Transit Management Center (TR)							
Basic Facilities, Comm for Large Area	TR014		4000	4000	400	600	For population >750,000.
Basic Facilities, Comm for Medium Area	TR015		3200	3200	400	480	For population <750,000 and >250,000.
Basic Facilities, Comm for Small Area	TR016		2800	2800	400	420	For population <250,000.
Transit Center Hardware	TR001	10	15	30			Includes 3 workstations.
Transit Center Software, Integration	TR002	20	815	1720	6	12	Includes vehicle tracking & scheduling, database & information storage, schedule adjustment software, real time travel information software, and integration. Software is COTS.
Transit Center Additional Building Space	TR003				6	9	Additional space required for ITS technology - $12-$18 / sq.ft., 500 sq.ft.
Transit Center Labor	TR004				50	250	Labor for 3 staff @ 75K. Salary cost are fully loaded prices including base salary, overtime, overhead, benefits, etc.

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Subsystem/Unit Cost Element	IDAS No.^	Lifetime* (years)	Capital Cost ($K) Low	Capital Cost ($K) High	O&M Cost ($K/yr) Low	O&M Cost ($K/yr) High	Notes
Upgrade for Auto. Scheduling, Run Cutting, or Fare Payment	TR005	20	20	40	0.4	0.8	Processor/software upgrade, installation and 1 yr. maintenance (for processor). Software is COTS.
Integration for Auto. Scheduling, Run Cutting, or Fare Payment	TR012	20	225	500			Integration with other systems.
Further Software Upgrade for E-Fare Payment	TR013	20	40	60	0.8	1.2	Software upgrade. Software is COTS.
Vehicle Location Interface	TR007	20	10	15			Vehicle location interface.
Vehicle Location Equipment				275		16.5	
Video Monitors for Security System	TR008	10	15	20	0.75	1	Five per site.
Hardware for Security System	TR009	10	55	90	1.1	1.8	Includes 1 server and 3 workstations.
Integration of Security System with Existing Systems	TR010	20	250	500			Integration with other systems.
Labor for Security System	TR011				202	247	Labor for 3 staff @ 75K each. Salary cost are fully loaded prices including base salary, overtime, overhead, benefits, etc.
Toll Administration (TA)							
Toll Administration Hardware	TA001	5	10	15	1	1.5	Includes Pentium PC with 1G hard drive, 2 workstations, printer, and modem.
Toll Administration Software	TA002	10	40	80	4	8	Includes local database and national database coordination. Software is COTS.
Transit Vehicle On-Board (TV)							
Driver Interface and Schedule Processor	TV001	10	0.3	0.5	0.006	0.01	On-board schedule processor and database.
Cell Based Communication Equipment	TV002	10	0.15	0.25	0.0075	0.0125	Cell-based radio with data capacity.
GPS/DGPS for Vehicle Location	TV003	10	0.5	0.8	0.01	0.016	AVL GPS/DGPS.
Signal Preemption Processor	TV004	10	0.3	0.6	0.006	0.01	On-board schedule processor and database.
Signal Preemption/Priority Emitter			0.5	1.2			Data-encoded emitter; manually initiated.
Preemption/Priority Transponder			0.075				Passive transponder mounted on underside of transit vehicle. Requires transit priority system at the Transit Management Center.
Trip Computer and Processor	TV005	10	0.1	0.15	0.002	0.003	On-board processor for trip reporting and data storage.
Security Package	TV006	10	4.2	5.3	0.21	0.265	On-board CCTV surveillance camera and hot button.
Electronic Farebox	TV007	10	0.8	1.5	0.04	0.075	On-board flex fare system DBX processor, on-board farebox, and smart card reader.
Commercial Vehicle Administration (CA)							
Commercial Vehicle Admin Hardware	CA001	10	15	30	0.3	0.6	Includes 3 workstations.
Commercial Vehicle Admin Software, Integration	CA002	20	200	220	4	4.4	Includes processor and integration. Software is COTS .
Commercial Vehicle Admin Labor	CA003				270	330	Labor for 4 staff @ 75K (average). Salary costs are fully loaded prices including base salary, overtime, overhead, benefits, etc.
Software Upgrade for Electronic Credential Purchasing, Mgt	CA004	20	60	140	1.2	2.8	Electronic credentials purchase software, database and management for post-trip processing & E-credentials.
Software Upgrade for Inter-Agency Info Exchange	CA005	20	20	40	0.4	0.8	Processor and integration add-on. Software is COTS.
Added Labor for Inter-Agency Info Exchange	CA006				67	82	Labor for 1 staff @ 75K (average). Salary cost are fully loaded prices including base salary, overtime, benefits, etc.
Software Upgrade for Safety Administration	CA007	20	40	80	0.8	1.6	Database add-on, software, and integration. Software is COTS.
Commercial Vehicle Check Station (CC)							
Check Station Structure	CC001	20	50	75			Roadside structure - mainline w/ lane indicator signals.
Signal Board	CC002	10	10	15	1	1.5	Roadside signal board.
Signal Indicator	CC003	20	5	10	0.25	0.5	Signal indicator system.
Roadside Beacon	CC004	10	5	8	0.5	0.8	Roadside beacon used for electronic screening (not included in roadside subsystem). Beacon repair/replacement maintenance.
Wireline to Roadside Beacon	CC005	20	10	20			Dedicated wireline communication from beacon to roadside (1 mile upstream).
Check Station Software, Integration	CC006	20	180	215			Software, processor and integration.
Check Station Hardware	CC007	10	0.3	0.5	0.006	0.01	Includes 1 workstation.
Detection System	CC008	10	50	75	2.5	3.75	Commercial vehicle communication interface and communication device (cell based radio).
Software Upgrade for Safety Inspection	CC009	20	40	80	0.8	1.6	Safety-database add-on, and result writing to vehicle tag processor add-on. Software is COTS.
Handheld Safety Devices	CC010	5	3	5	0.3	0.5	For commercial vehicle inspection. The devices either measure data themselves or read data from the vehicle. Three per location.
Software Upgrade for Citation and Accident Recording	CC011	20	20	40	1	2	Software add-on for recording of citation and accident information to the commercial vehicle.
Weigh-In-Motion Facility	CC012	10	14	21	1.4	2.1	Includes WIM fixed load cell and interface to roadside facility. Software is COTS.
Wireline to Weigh-In-Motion Facility	CC013	10	1	2	0.1	0.2	Wireline communication (local line).
Commercial Vehicle On-Board (CV)							
Electronic ID Tag	CV001	10	0.65	1.1	0.013	0.022	Includes ID tag, additional software & processing, and database storage. Software is COTS.
Communication Equipment	CV002	10	1.15	2.25	0.0075	0.0125	Commercial vehicle communication interface and communication device (cell-based radio).
Central Processor and Storage	CV003	10	0.3	0.5	0.006	0.01	Equipment on board for the processing and storage of cargo material.
GPS/DGPS	CV004	10	0.3	0.5	0.006	0.01	GPS for vehicle location.
Driver and Vehicle Safety Sensors, Software	CV005	10	1.1	2.2	0.04	0.08	Additional software and processor for warning indicator and audio system interface, and onboard sensors for engine/vehicle and driver. Software is COTS.
Cargo Monitoring Sensors and Gauges	CV006	10	0.17	0.35	0.017	0.035	Optional on-board sensors for measuring temperature, pressure, and load leveling.
Fleet Management Center (FM)							
Fleet Center Hardware	FM001	10	15	30	0.3	0.6	Costs include 3 workstations.
Fleet Center Software, Integration	FM002	20	215	500			Includes processor and integration. Software is COTS.
Fleet Center Labor	FM003				337	412	Labor for 5 staff @ 75K. Salary costs are fully loaded prices including base salary, overtime, overhead, benefits, etc.
Software for Electronic Credentialing, Clearance	FM004	20	80	180			Includes electronic credential purchase software, database and management for trip reports, and database management for preclearance. Software is COTS.
Software for Tracking and Scheduling	FM005	20	40	100	4	10	Vehicle tracking and scheduling. Software is COTS.
Vehicle Location Interface	FM006	20	10	15			Vehicle location interface from FMS to TMS.
Software Upgrade for Fleet Maintenance	FM007	20	20	40	0.4	0.8	Processor/software upgrade to add capability to automatically generate preventative maintenance schedules from vehicle mileage data. Software is COTS.
Integration for Fleet Maintenance	FM008	20	100	200	2	4	Integration with other systems.
Software Upgrade for HAZMAT Management	FM009	20	20	40	0.4	0.8	Vehicle tracking & scheduling enhancement. Software is COTS.
Hardware Upgrade for HAZMAT Management	FM010	10	5	10	0.1	0.2	Includes 1 workstation.
Vehicle On-Board (VS)							
Communication Equipment	VS001	7	0.2	0.4	0.004	0.008	Wireless data transceiver.
In-Vehicle Display	VS002	7	0.05	0.1	0.001	0.002	In-vehicle display/warning interface. Software is COTS.

ITS UNIT COST DATABASE (as of September 30, 2001)

Subsystem/Unit Cost Element	IDAS No.^	Lifetime* (years)	Capital Cost ($K)		O&M Cost ($K/yr)		Notes
			Low	High	Low	High	
In-Vehicle Signing System	VS003	7	0.16	0.4	0.0032	0.008	Interface to active tag reader, processor for active tag decode, and display device for messages.
GPS/DGPS	VS004	7	0.25	0.5	0.005	0.01	Global Positioning System/Differential Global Positioning Systems.
GIS Software	VS005	7	0.2	0.3			Geographical Information System (GIS) software for performing route planning.
Route Guidance Processor	VS006	7	0.1	0.15	0.002	0.003	Limited processor for route guidance functionality.
Sensors for Lateral Control	VS007	7	0.8	1.1	0.016	0.022	Includes lane sensors in vehicle and lateral sensors MMW radar.
Electronic Toll Equipment	VS008	7	0.04	0.1			Active tag interface and debit/credit card interface.
Mayday Sensor and Processor	VS009	7	0.15	0.65	0.003	0.013	Collision detector sensor and interface for Mayday processor. Software is COTS.
Sensors for Longitudinal Control	VS010	7	0.3	0.5	0.006	0.01	Longitudinal sensors MMW radar.
Advanced Steering Control	VS011	7	0.5	0.6	0.01	0.012	Advanced steering control ("hands off" driving). Software is COTS.
Advanced Cruise Control	VS012	7	0.15	0.3	0.003	0.006	Adaptive cruise control (automatic breaking and accelerating)
Intersection Collision Avoidance Processor, Software	VS013	7	0.28	0.55	0.0056	0.011	Software/processor for infrastructure transmitted information, interface to in-vehicle signing and audio system, software and processor to link to longitudinal and lateral vehicle control modules based on input signal from vehicle intersection collision warning equipment package. Software is COTS.
Vision Enhancement System	VS014	7	1.2	2.2	0.06	0.11	In-vehicle camera, software & processor, heads-up display, and infra-red sensors (local sensor system). Software is COTS.
Driver and Vehicle Safety Monitoring System	VS015	7	0.66	1.25	0.033	0.0625	Safety collection processor and software, driver condition sensors, six vehicle condition sensors (@ $50 each), and vehicle data storage. Software is COTS.
Pre-Crash Safety System	VS016	7	1.1	2.15	0.037	0.067	Vehicle condition sensors, vehicle performance sensors, software/processor, interface, pre-crash safety systems deployment actuators. Software is COTS.
Software, Processor for Probe Vehicle	VS020	7	0.05	0.15	0.001	0.003	Software and processor for communication to roadside infrastructure, signal generator, message generator. Software is COTS.
Active Tag		7	0.02	0.05	0.002	0.005	Vehicle tag that can be updated (writable).
Passive Tag		5		0.015			Read-only vehicle tag.
In-Vehicle Navigation System		7		2.8			COTS product that includes in-vehicle display and supporting software.
Personal Devices (PD)							
Basic PDA	PD001	7	0.25	0.4	0.005	0.008	Personal digital assistant.
Advanced PDA for Route Guidance, Interactive Information	PD002	7	0.5	0.75	0.01	0.015	Personal digital assistant with advanced capabilities (route guidance, interactive).
Modem Interface, Antenna for PDA	PD003	7	0.18	0.25	0.0036	0.005	Modem interface and separate antenna for wireless capability.
PDA with Wireless Modem		5		1.33			Personal digital assistant with wireless modem.
Software Upgrade for Interactive Information		7	0.1	0.2	0.002	0.004	Software is COTS.
GPS/DGPS	PD005	7	0.5	0.8	0.025	0.04	GPS/DGPS.
GIS Software	PD006	7	0.1	0.15	0.005	0.0075	Additional GIS/GUI capability.

^ Applicable only to unit cost elements used in IDAS

* Not available for several equipment or subsystems

COTS - Commercial off-the-shelf